

I claim:

1. An apparatus for evaluating the characteristics of sample comprising:  
a light source for generating a probe beam;  
a focusing element for focusing the beam onto the surface of the sample in  
5 manner to create a spread of angles of incidence with varying azimuthal angles;  
a retarder located in the path of the beam;  
a polarizer located in the path of the reflected beam;  
a detector in the path of the reflected beam, said detector defined by a two-  
dimensional array of detector elements, each element generating individual output  
10 signals; and  
a processor for calculating the difference between the sum of the output  
signals of elements lying along a first pair of orthogonal axes and the difference  
between the sum of the output signals of elements lying along a second pair of  
orthogonal axes disposed at a 45 degree azimuthal angle with respect to the first pair  
15 of axes, said processor evaluating the characteristics of the sample based on said  
calculations
2. An apparatus as recited in claim 1, wherein said light source is a narrow band  
laser.  
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3. An apparatus as recited in claim 1, wherein the light source generates a  
polychromatic probe beam and further including a means to permit detection of the probe  
beam as a function of wavelength.
- 25 4. An apparatus as recited in claim 3, wherein said means is defined by a  
selectable color filter located in the path of the beam.

5. An apparatus for evaluating the characteristics of sample comprising:  
a light source for generating a probe beam;  
a focusing element for focusing the beam onto the surface of the sample in  
manner to create a spread of angles of incidence with varying azimuthal angles;  
5 a retarder located in the path of the beam;  
a polarizer located in the path of the reflected beam;  
a detector in the path of the reflected beam, said detector defined by a two-  
dimensional array of detector elements, each element generating output signals; and  
a processor for correlating the individual output signals from the detector  
10 elements to specific angles of incidence and a plurality azimuthal positions, said  
azimuthal positions including two orthogonal axes and at least two more azimuthal  
positions intermediate the orthogonal axes, said processor evaluating the  
characteristics of the sample based on said correlation.

15 6. An apparatus as recited in claim 5, wherein the processor operates to calculate  
the difference between the sum of the output signals of detector elements disposed along said  
two orthogonal axes and the difference between the sum of the output signals of the detector  
elements disposed along said at least two more azimuthal positions intermediate said two  
orthogonal axes.

20 7. An apparatus as recited in claim 5, wherein said light source is a narrow band  
laser.

25 8. An apparatus as recited in claim 5, wherein the light source generates a  
polychromatic probe beam and further including a means to permit detection of the probe  
beam as a function of wavelength.

30 9. An apparatus as recited in claim 8, wherein said means is defined by a  
selectable color filter located in the path of the beam.